



КАТЕДРА МЕТЕОРОЛОГИЯ И ГЕОФИЗИКА  
ФИЗИЧЕСКИ ФАКУЛТЕТ - СУ "Св. Кл. Охридски"

## Семинар „Кръстанов“

В четвъртък, 21 Ноември 2019, от **17:30** ч. в зала В60

**Professor Georgios Sirakoulis,**  
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ще изнесе доклад на тема:

### **Complex systems modeling with Cellular Automata: Basic Principles and Future Perspectives through Hardware Implementation**

**Abstract:** Complex systems have been traditionally characterized by multi-variability, non-linearity, and uncertainty, while other attributes like emergent behavior, heterogeneous, inconsistent, and changing elements, normal failures and operational and managerial independence of their fundamental elements are also prominent in the core existence of these dynamic systems. Such an example of complex system, earthquake can be defined as a spatially extended dissipative dynamic system that naturally evolves into a critical state with no characteristic time or length scales.

As an auspicious computational tool for complex systems modeling, Cellular Automata (CAs) combine unique characteristics and important features, like inherent parallelism, local interactions, emergent behavior that could promise high precision modeling solutions with the minimum computational cost. Towards this direction, the parallel implementation of CAs in suitable hardware platforms like Field Programmable Gate Arrays (FPGAs) and modern parallel processors like Graphics Processing Units (GPUs) is a *sine qua non* computing condition for real time and efficient, in terms of computational resources, decision systems. In this presentation, we will focus on basic principles of CAs for modeling complex systems and how these models can be further calibrated with real data provided. Furthermore, we will discuss these implementations' aspects by presenting different cases of complex systems and how the corresponding CA based models can be adequately depicted in FPGAs and GPUs.

**Всички заинтересовани са добре дошли!**